DESIGN & CONSTRUCTION GROUP
THE GOVERNOR NELSON A. ROCKEFELLER
EMPIRE STATE PLAZA
ALBANY, NY 12242

ADDENDUM NO. 1 TO PROJECT NO. 47175

CONSTRUCTION, ELEVATOR, HVAC, PLUMBING, AND ELECTRICAL WORK
REPLACE ELEVATORS 1 – 5
DULLES STATE OFFICE BUILDING
317 WASHINGTON ST
WATERTOWN, NY

July 11, 2023

NOTE: This Addendum forms a part of the Contract Documents. Insert it in the Project Manual. Acknowledge receipt of this Addendum in the space provided on the Bid Form.

CONSTRUCTION WORK

1. SECTION 078400 FIRESTOPPING: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 078400-1 through 078400-6) noted "Revised 7/3/23".

ELEVATOR WORK

2. Page 140120-4, Paragraph 1.05 B (1): Change "008091 Elevator Preventative Maintenance" to "142100 Elevator Full Maintenance".

3. SECTION 142100 ELEVATOR FULL MAINTENANCE: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 142100-1 through 142100-13) noted "Revised 7/3/23".

APPENDIX – ALL TRADES

4. COMMISSIONING PROCESS: Discard the Document bound in the Project Manuals and substitute the accompanying Document (pages AGCP-1 through AGCP-16) noted "Revised 7/3/23".

END OF ADDENDUM

Brady M. Sherlock, P.E.
Director, Division of Design
Design & Construction

SECTION 078400

FIRESTOPPING

PART 1 GENERAL

1.01 REFERENCES

A. UL 263 Fire Tests of Building Construction and Materials.

B. UL 1479 Fire Tests of Through-Penetration Firestops.

C. UL 2079 Standard for Safety Tests for Fire Resistance of Building Joint Systems.

D. ASTM E 119 Methods of Fire Tests of Building Construction and Materials.

E. ASTM E 814 Method of Fire Tests of Through-Penetration Fire Stops.

1.02 DEFINITIONS

A. UL Fire Resistance Directory: Product directory published yearly, with supplements, by Underwriters Laboratories Inc., containing listings and classifications in effect as of the published date for product categories covered by UL.

B. Inchcape Directory of Listed Products: Product directory published yearly by Inchcape Testing Services containing listings which reflect certifications granted for materials, products, systems and equipment which have been tested by Inchcape Testing Services to recognized governing standards.

C. Omega Point Laboratories Listings Directory: Product Directory published yearly by Omega Point Laboratories, Inc. containing listed building products, materials, and assemblies which have been tested by Omega Point Laboratories to recognized governing standards.

D. Factory Mutual Approval Guide: Product directory published yearly, with supplements, by Factory Mutual Research Corp., containing listed building products, materials, and assemblies which have been tested by Factory Mutual Research Corp., to recognized governing standards.

E. F Rating: Prohibits flame passage through the system and requires acceptable hose stream test performance.

F. T Rating: Prohibits flame passage through the system and requires the maximum temperature rise on the unexposed surface of the wall or floor assembly, on the penetrating item and on the fill material not to exceed 325 degrees F above ambient and requires acceptable hose stream test performance.

G. Company Field Advisor: An employee of the Company which lists and markets the primary components of the system under their name who is certified in writing by the Company to be technically qualified in design, installation, and servicing of the required

products or an employee of an organization certified by the foregoing Company to be technically qualified in design, installation, and servicing of the required products. Personnel involved solely in sales do not qualify.

1.03 DESIGN REQUIREMENTS

A. Devices and materials shall meet the hourly fire resistance ratings required by the Project as determined by UL 263, UL 1479, UL 2079, ASTM E 119, or ASTM E 814 and be listed and detailed in the UL Fire Resistance Directory, Inchcape Directory of Listed Products, Factory Mutual Approval Guide, or the Omega Point Laboratories Listings Directory.

1. Exception: Where no listed designs exist that meet the requirements of a specific project condition, submit details and manufacturer's written recommendations for a design meeting the requirements. Include evidence of engineering judgment and extrapolation from listed designs.

1.04 SUBMITTALS

A. Product Data: Catalog sheets, specifications and installation instructions for each firestop device and material.

1. Indicate design number for each firestop proposed to be used which is detailed in the UL Fire Resistance Directory, Inchcape Directory of Listed Products, Factory Mutual Approval Guide, or the Omega Point Laboratories Listings Directory.
2. State the specific locations where each firestop system is proposed to be installed.

B. Firestop Schedule: Submit schedule itemizing the following:

1. Manufacturer's product reference numbers and/or drawing numbers.
2. UL, Inchcape Testing Services, Factory Mutual Research Corp., or Omega Point Lab design number.
3. Location of firestop material.
4. Penetrating Item Description/Limits: Material, size, insulated or uninsulated, and combustibility.
5. Maximum allowable annular space or maximum size opening.
6. Wall type construction.
7. Floor type construction.
8. Hourly Fire resistance rating of wall or floor.
9. F rating.
10. T rating, if available.

NOTE: Firestop Schedule is for information only and will not be acted on for approval. Refer to Sample Firestop Schedule bound in Appendix.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: The persons installing the firestopping and their supervisor shall be personally experienced in firestop work and shall have been regularly employed by a company installing firestopping for a minimum of 3 years.

B. Pre-Installation Conference: Before the firestop work is scheduled to commence, a conference will be called by the Director's Representative at the Site for the purpose of

reviewing the Contract Documents and discussing requirements for the Work. The conference shall be attended by related trade Contractors (if any), their qualified firestopping installers, and associated firestopping manufacturer's Company Field Advisors.

C. Container/Package Labels: Include manufacturer's name and identifying product number, date of manufacturer, lot number, shelf life (if applicable), qualified testing and inspecting agency classification marking, curing time, and mixing instructions for multi-component materials.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver firestopping materials to the Site in original, new unopened containers or packages bearing manufacturer's printed labels.

B. Store and handle firestopping materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, etc.

1.07 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Temperature: Do not install firestopping materials when ambient or substrate temperatures are outside limits permitted by manufacturer of firestopping materials.
   2. Humidity and Moisture: Do not install the Work of this Section under conditions that are detrimental to the application, curing, and performance of the materials.
   3. Ventilation: Provide sufficient ventilation wherever firestopping materials are installed in enclosed spaces. Follow manufacturer's recommendations.

1.08 SEQUENCING AND SCHEDULING

A. Leave exposed those firestopping installations that are to be concealed behind other construction until the Director's Representative has examined each installation.

PART 2 PRODUCTS

2.01 FIRESTOPPING-GENERAL

A. Through-Penetration Firestop Devices, Forming Materials, And Fill, Void, or Cavity Materials: As listed in the UL Fire Resistance Directory, Inchcape Directory of Listed Products, Factory Mutual Approval Guide, or the Omega Point Laboratories Listings Directory.
   1. For firestopping exposed to moisture, furnish products that do not deteriorate when exposed to this condition.
   2. For firestopping systems exposed to view, furnish products with flame-spread values of less than 25 and smoke developed values less than 50, as determined per ASTM E 84.

B. Accessories: Components required to install fill materials as recommended by the firestopping manufacturer for particular approved fire rated system.

C. Identification Labels:
   1. Furnished by fire stopping manufacturer of suitable material for permanent field identification of through-penetration firestops.
   2. Identify the following:
      a. "WARNING - FIRESTOP MATERIAL".
      b. Company Name.
      c. Product Catalog number.
      d. F rating.
      e. T rating, if available.
   3. Field fabricated labels are not acceptable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine existing through-penetrations of floors, walls, partitions, ceilings, and roofs in the Work areas.

B. Examine existing junctures, control joints, and expansion joints in the Work areas.

C. Where firestopping is missing or not intact, submit a written report to the Director's Representative describing the existing conditions.

3.02 PREPARATION

A. Clean out openings immediately before installation of through-penetration firestopping. Comply with recommendations of firestopping manufacturer and the following requirements:
   1. Remove foreign materials from surfaces of openings, and from penetrating items that could interfere with adhesion of firestopping.
   2. Clean opening and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form release agents from concrete.

B. Clean out openings, and juncture, control, and expansion joints immediately before installation of firestopping. Comply with recommendations of firestopping manufacturer and the following requirements:
   1. Remove foreign materials from surfaces of openings and joint substrates, and from penetrating items that could interfere with adhesion of firestopping.
   2. Clean opening joint substrates to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form release agents from concrete.

C. Protection:
   1. Protect surfaces adjacent to through-penetration firestops with non-staining removable masking tape or other suitable covering to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or

that would be caused by cleaning methods used to remove smears from firestopping materials.

D. Substrate Priming:
1. Prime substrates in accordance with the firestopping manufacturer's printed installation instructions using recommended products and methods.
2. Do not allow primer to spill or migrate onto adjoining exposed surfaces.

3.03 INSTALLATION OF THROUGH PENETRATION FIRESTOPS

A. Use through-penetration firestop devices, forming materials, and fill, void, or cavity materials to form through-penetration firestops to prevent the passage of flame, and limit temperature rise of the unexposed surface as detailed in the UL Fire Resistance Directory, Inchcape Directory of Listed Products, Factory Mutual Approval Guide, or the Omega Point Laboratories Listings Directory.
1. Where applicable design is not detailed in the Directories, use forming materials and fill, void, or cavity material to form through-penetration firestop in accordance with approved printed details and installation instructions from the company producing the forming materials and fill, void or cavity material.
2. If the construction type(s) of the building cannot be determined, provide firestopping with fire resistance ratings as specified in the Building Code of New York State, Tables 720.1(1), 720.1(2), 720.1(3), and 302.3.2.

B. Provide through-penetration firestop systems with F ratings that shall equal or exceed the fire resistance rating of the penetrated building construction.

C. Provide through-penetration firestop systems with T ratings, in addition to F ratings, at floors where the following conditions exist:
1. Where firestop systems protect penetrations located outside the wall cavities.
2. Where firestop systems protect penetrations located outside fire resistive shaft enclosures.
3. Through-penetration firestop systems protecting floor penetrations require a T-rating of at least 1 hour, but not less than the required floor fire-resistance rating.

D. Firestop through-penetrations of floors, walls, partitions, ceilings, and roofs.

F. Firestop through-penetration of partitions identified on the Construction Work Drawings as smoke partitions and fire rated assemblies.

G. Firestop through-penetrations of floors, walls, partitions, ceilings, and roofs in accordance with the fire resistance rating assigned to the walls, partitions, floors, ceilings, and roofs on the Construction Work Drawings.

H. In areas where through-penetration items have been installed before the construction work, firestop the through-penetration items after the construction work have been completed. Furnish drawings or written information to the Construction Work Contractor covering the provisions to be made in the construction work to enable firestopping of the through-penetration items.

I. Permanently affix label at each firestop. Use adhesive compatible with surface construction at firestop location.

3.05 CLEANING

A. Clean off excess fill materials and sealants adjacent to penetrations by methods and cleaning materials recommended by manufacturers of firestopping products and of products in which penetrations occur.

B. Remove masking tape as soon as practical so as not to disturb the firestopping's bond with substrate.

C. Protect firestopping during and after curing period from contact with contaminating substances, or damage resulting from adjacent Work.

D. Cut out and remove damaged or deteriorated firestopping immediately, and install new materials as specified in firestop schedule.

END OF SECTION

SECTION 142100

ELEVATOR FULL MAINTENANCE SPECIFICATION

PART 1 - GENERAL

1.01 MAINTENANCE DURATION

A. Within 10 days of contract award, Contractor shall assume Full Maintenance responsibilities as outlined within this specification section, for elevators #1 through #5 which are located in at the Dulles State Office Building.

B. As each elevator is taken out of service as part of the phased modernization, it shall no longer require maintenance. Once the modernization is completed and the elevator accepted for public use, maintenance will resume under Warranty Maintenance and continue until substantial project completion. Upon substantial project completion, all four elevators shall remain on Warranty Maintenance for an additional 12 months.
   1. Refer to the Division 01 specifications for the construction schedule and phasing.

C. Upon completion of the 12-month Warranty Maintenance period, this maintenance agreement will be terminated, and maintenance of the elevators shall revert back to the Dulles State Office Building Elevator Maintenance Contract in effect at the time of termination.

D. Elevators other than those listed above shall not be associated with this maintenance agreement.

1.02 CONTRACTOR GENERAL RESPONSIBILITIES

A. This specification provides for full maintenance service for all equipment specified in the "Equipment to Be Maintained List" (Exhibit A) and any component or accessory not specifically mentioned, which is essential for the proper operation and functioning of the elevators. The full maintenance service includes the furnishing of all material, labor, supervision, diagnostic tools, laptops, tools, supplies, weights, and other expenses necessary to provide full maintenance service, and repairs of every description, including inspections, tests, adjustments, and replacement parts. Full maintenance service includes all maintenance tasks as described herein, including emergency call back service on an as-needed basis. All maintenance, adjustments, tests, and repairs shall be in compliance with the latest adopted editions of ASME A17.1 Safety Code for Elevators and Escalators, A17.2 Inspector's Guide for Elevators and Escalators. The terms and requirements of this contract are specified in the singular with the understanding that all provisions shall be applicable to all units unless otherwise specified. The safety practice and procedures in the "Elevator Industry Field Employees Safety Handbook" shall also be followed when performing maintenance and repairs.

B. All work shall be performed during the regular working hours of the regular working days of the elevator trade, 7:00am to 6:00pm, Monday through Friday, except the

following union designated holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, the Friday after Thanksgiving Day, and Christmas Day.

C. The maintenance tasks associated with the full maintenance service are provided herein. All systems, components, and equipment covered under this agreement shall be maintained at the highest level of efficiency and at an acceptable level throughout the maintenance period. An acceptable level of maintenance is defined as that level of maintenance that will preserve the equipment in unimpaired operating condition (i.e., above the point where deterioration will begin, thereby diminishing the normal life expectancy of the equipment).

D. The only circumstance where the CONTRACTOR shall not be obligated under this agreement to repair damage at no additional cost is where such damage was caused by vandalism, fire, acts of God, negligence by the Dulles State Office Building (OWNER), or other unusual circumstances (except that which is caused by the CONTRACTOR). For repair or replacement of materials that are not covered under the terms of this contract the CONTRACTOR shall present an itemized quote "Chargeable Billing per Contract Terms" (Exhibit B), for material and labor, to the OWNER. The OWNER will decide how to proceed with all repairs. OWNER'S review and approval is required for all out-of-contract work. The OWNER reserves the right to require that the CONTRACTOR submit a completed T&M proposal within 48 hours upon request.

E. The CONTRACTOR shall provide shall provide 24-hour-a-day, 7 days-a-week, callback service, as part of the monthly maintenance fee and at no added cost to the OWNER.

1. In the event of callback service, a journeyman elevator mechanic will report to the site of the call, when requested by the OWNER, in accordance with the following schedule:
    a. Within one (1) hour after the receipt of request for service for any stalled elevator(s) containing a trapped passenger.
    b. Within two (2) hours after the receipt of request for service for any non-entrapment calls.
    c. The OWNER reserves the right to schedule the callback service for the next regular working day.

F. CONTRACTOR shall provide a written Maintenance Control Program (MCP) that meets or exceeds any and all requirements of the latest adopted edition of A17.1 Code, Section 8.6. The MCP shall include, but not be limited to, records of inspection, maintenance, lubrication, repair, replacements, testing and callback services. These records shall be available to the OWNER and elevator personnel at all times. Maintenance tasks and intervals are outlined herein.

G. All preventive maintenance tasks identified herein shall be completed within the specified frequency as defined in the schedule matrix.

H. Should it be identified that the quality of the maintenance services being performed is not satisfactory and that the requirements of this Agreement are not being met, the CONTRACTOR will be notified of these deficiencies in writing, and it shall be the CONTRACTOR'S responsibility to make the necessary corrections within ten (10) working days after receipt of such notice.

I. All parts, materials, components and equipment provided by the CONTRACTOR shall be new and of the same brand name and manufacturer as the item being replaced or with an OWNER pre-approved equal. These parts, materials, components and equipment shall be fully warranted [material] by the CONTRACTOR to be free of defects (manufacturing and workmanship) for one year from installation.

J. The OWNER will have a maintenance audit performed on the elevators annually. All deficiencies noted during the maintenance audit that are the responsibility of the CONTRACTOR under the Full Maintenance Agreement shall be corrected within thirty (30) working days of being notified by the OWNER. OWNER shall take into account circumstances that are beyond the control of the CONTRACTOR and shall work with the CONTRACTOR for an extension of time. Within three (3) working days of said notification, CONTRACTOR shall provide the OWNER a schedule which includes, but is not limited to: outlining the required scope of work and start and completion dates for the work. If the deficiencies are not corrected after thirty (30) working days, or the agreed upon time period, the OWNER reserves the right to solicit offers from, and have deficiencies corrected by other sources. The cost of the deficiency corrections shall be deducted from the money owed to the CONTRACTOR as part of the maintenance agreement.

K. Deficiencies involving riding public safety shall be corrected immediately upon notification by the OWNER.

L. The CONTRACTOR shall be responsible for maintaining the lighting fixtures installed in car, hoistway, pit, car top, and car emergency lighting. This will include all lighting fixture bulbs, lamps, and tubes. The CONTRACTOR shall be responsible for maintaining the car telephone and associated traveling cable telephone wires. The following items of work are specifically not included as work that the CONTRACTOR is responsible to perform:

1. Refinishing of the elevator car interior walls, elevator car interior ceiling, car door panels, and elevator car floor covering
2. Elevator equipment room lighting ballasts and light fixtures (except bulb replacement)
3. Hoistway enclosure walls, hoistway door panels and frames and hoistway sills.
4. Telephone lines from the interface with the elevator
5. Main line power and cab lighting disconnect switches or circuit breakers
6. Emergency power plants and associated transfer switches
7. Replacement of broken cab handrails.
8. Machine room cooling and heating equipment
9. Replacement of sump pump
10. Replacement of smoke/heat detectors and fire alarm system

M. The Dulles State Office Building operates 24 hours a day/7 days a week. If an elevator is continuously out-of-service for more than forty-eight (48) hours, then the OWNER reserves the right to deduct 10% from the total amount of the next monthly maintenance invoice. If the downtime exceeds thirty (30) continuous days, then the

1. OWNER reserves the right to deduct the entire monthly maintenance fee for the elevator or 15% from the total amount of the next monthly maintenance invoice, whichever is greater. The length of time that an elevator is out-of-service shall be measured by the OWNER; beginning at such time the OWNER notifies the CONTRACTOR that the elevator is out-of-service or that an unsafe condition

exists and ending at such time the elevator is safely placed back into service. The OWNER may interrupt the total "downtime" duration.

a. The OWNER reserves the right to extend the thirty (30) continuous days under special circumstances involving long lead time for a special part.

N. All elevators shall be appropriately inspected every six (6) months, annually, and every five (5) years by a certified elevator inspection service contracted by the OWNER. The CONTRACTOR shall provide any needed equipment to perform the pretest examinations and tests at no additional cost to the OWNER. The CONTRACTOR shall provide all necessary weights and testing equipment, an adequate quantity of qualified journeyman elevator mechanics familiar with the equipment to perform tests and assist the inspector at no additional cost to the OWNER. The CONTRACTOR shall periodically examine and test all safety devices, governors, oil buffers, etc. The CONTRACTOR shall make formal safety tests and inspections as required and outlined in the current adopted edition of ASME A17.1. These tests shall be conducted in the presence of a certified QEI Elevator Inspector. Tests performed on 1 and 5-year intervals will be scheduled to comply with the 1 and 5-year intervals specified in the current adopted edition of ASME A17.1 Appendix N. The CONTRACTOR shall furnish test and condition reports to the OWNER after each test. After tests have been performed, all load weighing devices, etc. shall be checked and adjusted as required to meet manufacturer's recommendations. Cars shall not be placed in service until all tests, checks and adjustments are completed, and the elevators are in proper working condition. The CONTRACTOR will not be held responsible for any damage to the building and equipment (excluding elevator and related elevator equipment) caused by these tests, unless such damage is a result of negligence by the CONTRACTOR. Failure to follow correct procedures to prevent damages and failure to perform a pretest examination shall be considered negligence by the CONTRACTOR. If, during the inspection/testing of a particular elevator, such elevator fails; CONTRACTOR shall continue the inspection/testing procedure with other elevators so as not to delay the overall inspection/testing process. CONTRACTOR shall provide a separate crew to repair deficiencies.

O. Monthly testing of Firemen's Service, as required in the current adopted edition of ASME A17.1, shall be performed by the OWNER. OWNER shall record findings in Monthly Firefighters' Emergency Operation Test Log.

P. Sixty (60) days prior to the expiration of the agreement, the CONTRACTOR and OWNER will make a complete examination of the elevators covered under the agreement. The CONTRACTOR shall coordinate and schedule the examination with the OWNER. The OWNER shall determine if such an examination is warranted. The OWNER, at its expense, reserves the right to contact an independent Elevator Inspector if such an examination is warranted. The OWNER, with the assistance of the independent Elevator Inspector, will prepare a Deficiency Report listing all deficiencies noted during the examination. The CONTRACTOR shall correct all deficiencies as required by this contract, prior to the expiration of the agreement or risk being deemed a Non-Responsible vendor for any future contracts.

Q. The CONTRACTOR shall be completely responsible for their work, including any damages or breakdowns caused by their failure to take appropriate action.

R. The CONTRACTOR shall not make changes or alterations to the existing mechanical equipment, circuits, circuit wiring, or sequencing, and may not alter the original circuit or

wiring design of the elevators unless authorized in writing by the OWNER. The CONTRACTOR shall submit any such proposed change to the OWNER for approval and shall include complete legible drawings and wiring diagrams, as well as a complete description of the proposed change. Prior to submitting the proposed change, the CONTRACTOR shall, at its own expense, obtain comments from the original equipment manufacturer concerning the overall effect of such changes on the system. If changes are made, the CONTRACTOR shall provide the OWNER with three (3) copies of as-built drawings of the modifications including a complete description of the changes.

S. The CONTRACTOR shall maintain a complete set of current, legible schematic wiring diagrams in each elevator machine room for the elevators contained therein. At the end of the contract term, all schematic diagrams shall be left in the machine rooms.

T. The Contractor shall maintain all elevator equipment in machine rooms, hoistways, and pits in a clean orderly condition, free of dirt, rust, dust and debris.

U. The Contractor shall not be responsible for upgrading equipment to meet changes in Code requirements as may be recommended or directed by insurance companies, Federal, State, Municipal, or other Governmental authorities. The Contractor shall notify the OWNER of any Code changes that affect the site specific equipment and/or conditions.

1.03 GENERAL REQUIREMENTS FOR ALL SERVICE VISITS

A. Perform all work in a safe, organized manner.

B. Repairs and maintenance are to be performed with equipment properly tagged and locked out. The equipment is to be disabled, and all switch or switchgear surveyed and positioned to prevent shock hazards and the release of stored energy. Ensure that site personnel are aware of equipment status and potential hazard.

C. CONTRACTOR'S servicing technicians will be required to sign in and out in accordance with OWNER established procedure.

D. All work under this contract shall be performed by skilled, competent elevator mechanics directly employed and/or supervised by the CONTRACTOR. Elevator mechanic helpers and/or elevator mechanic apprentices may be used, provided they are under the direct supervision of a journeyman elevator mechanic on site at all times. Direct supervision means working under constant guidance or simultaneously with an elevator mechanic. All elevator mechanics shall have a minimum of three (3) years of experience maintaining elevators. Technicians shall have training and experience with facility-specific elevator controls. Sufficient personnel shall be assigned to complete maintenance in a timely manner. The mechanic will perform tests, checks, inspections, calibrations, adjustments, component replacements, repairs, and diagnostic assessment of the systems. The CONTRACTOR shall provide documentation to the OWNER of the competency of the personnel assigned to provide this service. OWNER reserves the right to review the CONTRACTOR'S technician qualifications and approve or reject all service providers based on their training and experience. OWNER reserves the right to conduct a security background check or otherwise approve any employee, Subcontractor or agent furnished by CONTRACTOR and to refuse access to or require replacement of any personnel for cause based on, including but not limited to, professional, technical or

training qualifications, quality of work or change in security status or non-compliance with the OWNER'S security or other requirements. Such approval shall not relieve the CONTRACTOR of the obligation to perform all work in compliance with the Contract terms.

E. Report to the OWNER any situations or observations, which could adversely affect the safety of OWNER'S staff, riding public or the operation of the elevators.

F. As documented in the Maintenance Control Program submit a completed Preventive Maintenance Checklist (all items initialed, including all recommendations) "in layman's terms" for each piece of equipment serviced at the end of each visit to the OWNER or his assigned designee, for review prior to leaving the site. Should both the OWNER and designee be unavailable, prior to leaving the site the CONTRACTOR shall submit the Preventive Maintenance Checklists via fax/e-mail to the OWNER or his assigned designee within 24 hours of leaving the site. The mechanic must initial the Preventive Maintenance Checklist when each maintenance task is successfully completed. If a specific task is not applicable to a specific piece of equipment, note, "N/A" on the Checklist along with a written notation explaining the reason for the "N/A" entry. OWNER assumes that all tasks not initialed, were not performed. The CONTRACTOR is required to provide written documentation describing why any task was not successfully performed. Successful completion/written documentation justifying non-performance for all tasks is required before invoices will be paid.

G. CONTRACTOR shall submit to the OWNER monthly reports listing all inspections, repairs, testing and callbacks, no later than five (5) business days after the end of each calendar month. OWNER reserves the right to change the format as needed. No contract payment will be approved without completion of this requirement. As part of the monthly report, the CONTRACTOR shall submit a line graph that shows the trend in callbacks and juxtaposes it against industry standards.

H. Repair any and all damage caused by CONTRACTOR to the building or property, to the satisfaction of the OWNER.

I. Upon request of the OWNER, CONTRACTOR shall be available to review issues such as recent work performed, quality of work, performance, and outstanding deficiencies. The CONTRACTOR will not receive additional compensation to attend these meetings.

J. The proper off-site disposal of all waste oil, empty containers and other waste material shall be the responsibility of the CONTRACTOR. CONTRACTOR is to provide to the OWNER all Federal, State and Local documentation required (waste manifests, bills of lading, etc.) for disposal of any hazardous and/or regulated waste.

K. Only one (1) elevator per bank shall be taken out of service at any one (1) time for regular maintenance, lubrication and servicing. The time of day that each elevator can be shut down for routine maintenance shall be scheduled with the OWNER to minimize the disruption caused by the elevator down-time. The CONTRACTOR shall inform the OWNER the reason(s) the elevator will be out of service and what time the elevator is expected to be put back in service for proper and safe operation. When an elevator is taken out of service for maintenance, a sign shall be placed at each opening stating, "This elevator is out of service, please use another elevator."

L. The CONTRACTOR shall maintain on-site spare parts in order to minimize downtime for spare parts procurement. CONTRACTOR shall provide a metal storage cabinet in the machine room to store spare parts. A list of minimum spare parts to be stored on-site and have on-hand locally, or available within 24 hours, are listed in "Spare Parts List" (Exhibit C). The supply of spare parts should be sufficient for the full maintenance and expedient emergency repair of the elevators.

M. The CONTRACTOR shall not remove operating components from active elevators for the installation in non-functioning elevators for the purpose of troubleshooting, unless pre-approved by the OWNER.

PART 2 - MAINTENANCE REQUIREMENTS

2.01 FULL SERVICE MAINTENANCE

A. The contractor shall bi-weekly examine, adjust, lubricate, clean, and when conditions warrant, repair or replace the following items and components thereof and all other mechanical or electrical equipment, including, but not limited to the following:

1. Entire machine, including housing, permanent magnet AC motor, sheave shaft and bearings, solid state VVVF drive, deflector sheave, sheave shaft and bearings, machine brake and brake assembly, emergency brake/rope brake and component parts.
2. Controller: All components including all relays, printed circuit boards, solid state starter, solid state components, resistors, condensers, transformers, leads, electrical timing devices, computer devices.
3. Car Positioning System: Encoder, tape, reader, and ancillary equipment.
4. Hoistway door interlocks, hoistway door hangers, hanger rollers, up-thrust rollers, tracks, bottom door gibs, and closers.
5. Hoistway limit switches, slowdown switches, leveling switches and associated cams and vanes.
6. Car and counterweight roller guide assemblies complete.
7. Door operators including motors, operator linkage, door infrared protective devices, car hangers, hanger rollers, tracks, car door contact, and clutch.
8. Traveling cables, and elevator control wiring in hoistway and machine room.
9. Governor including governor sheave and shaft assembly bearings, contact jaw, over-speed switch, and governor tension assemblies.
10. Car safety mechanism and load weighing equipment.
11. Hoist cables, belts, governor cables. Including adjustment and shortening of same as required by code.
12. Car and counterweight buffers.
13. Fixture contacts, push buttons, key switches and locks, lamps and sockets of button stations (car and hall), hall lanterns, position indicators (car and hall), direction indicators, solid state components and LEDs.

B. CONTRACTOR shall keep the guide rails free of rust. Renew guide shoe rollers as required to insure smooth and satisfactory operation. Contractor shall also examine and make necessary adjustment or repair to the following accessory equipment including re-lamping of signal equipment: hall stations, car stations, and direction indicators.

C. CONTRACTOR shall be responsible for keeping the exterior of the elevator machinery and any other parts of the equipment subject to rust, painted with heat resistant enamel and presentable at all times. The machine windings shall be treated as needed, with proper insulating compound as recommended by the machine manufacturer.

D. Cleaning and refinishing interior of cars and exterior of hoistway doors and frames is excluded from this contract.

E. Monthly Firefighters' Recall Service: The following current adopted edition of the A17.1 Code test shall be performed monthly by the OWNER:
   1. Phase 1- EMERGENCY RECALL OPERATION: Initiate by inserting Firefighters' key in Fire Recall switch at the designated level. Turn key to "ON" position. Wait for the four elevators to return to the designated level and their doors to fully open. If test is for Phase I only, turn key to "RESET" and then to "OFF" position and remove.
   2. Phase 2 - EMERGENCY IN CAR OPERATION: Remove key from designated level Fire Recall switch while still in the "ON" position. In the elevator place Fire Operation key switch to "ON" position. Register at least one floor car. Doors should remain open. Press "Door Close" button and hold until doors are fully closed. When car stops at next floor doors shall remain closed. Press "Door Open" button and hold until doors are fully open. Place key switch to "HOLD" position. Try registering a car call. Car shall not respond. Return key to "OFF" position. Elevator will proceed to the designated level. Remove key, repeat for next elevator.
   3. CLEAR: To clear fireman's recall test, insert key into designated level key switch. Turn to "RESET" and then to "OFF" position and remove key.

F. Correct any deficiencies found. CONTRACTOR shall be responsible for the correction of deficiencies. Monthly Firefighters' Recall log shall be available to elevator personnel and to the AHJ.

2.02 ITEMS OF PREVENTATIVE MAINTENANCE WORK

A. The preventive maintenance specified herein is considered the minimum for all equipment. If specific equipment covered by this Contract requires additional preventive maintenance for safe, reliable operation, as specified by the manufacturer, the CONTRACTOR shall perform the required additional preventive maintenance without added cost to the OWNER.

B. Semi-Monthly
   1. Perform general inspection of machine, sheaves, and brake. Lubricate as required.
   2. Inspect interior of cab. Test telephone or intercommunication system, normal and emergency lights, fan, and emergency alarm. Make needed repairs.
   3. Visually inspect controller. Verify cooling fan operation. Repair as necessary.
   4. Ride car and observe operation of doors, leveling, reopening devices, pushbuttons, lights, etc.
   5. Replace all burned out lamps in elevator cars, machine room, and pit.
   6. Replace any defective LED indicators in car operating panel and hall fixtures.
   7. Remove litter, dust, oil, etc. from the machine room.

8. Clean car sills.
9. Clean hoistway sills.

C. Monthly
1. Perform Semi Monthly checks.
2. Check door operation and adjust as necessary.
3. Clean trash from pit.
4. Observe operation of signal and dispatching system.
5. Observe brake operation and adjust or repair if required.
6. Check oil level in car and counterweight oil buffers and add oil as required.

D. Quarterly
1. Perform Monthly checks
2. Check leveling operation. Clean and adjust leveling switches, hoistway vanes, magnets, and inductors. Repair and/or adjust for proper leveling.
3. Clean, lubricate car door gate tracks, hangers, and up thrust eccentrics, linkages, and door gibs.
4. On hoistways doors, clean, lubricate as necessary, adjust tracks, hangers and eccentrics, linkages, door closers, clutch pick up rollers, gibs and interlocks.
5. Inspect all rope fastening. Clean governor and hoist ropes, lubricate hoist ropes if needed. Inspect all rope hitches and shackles and equalize rope tension.
6. Check adjustment of car and counterweight roller guides.
7. Inspect governor rope tension sheave fastenings and adjust as necessary.

E. Semi-Annually
1. Perform Quarterly checks.
2. Check Controller. Clean with blower. Check all resistance tubes and grids. Check operation of overloads. Clean and inspect fuses and holders and all controller connections. Check terminal connections for tightness.
3. In hoistway examine guide rails, cams and fastenings. Inspect and test limit and terminals switches.
4. Clean all dirt, dust, and debris from sheaves, landing sills, bottom of platform, car tops, counterweights and hoistway walls.
5. Inspect sheaves to ensure they are tight on shafts. Sound spokes and rim with hammer for cracks.
6. Examine all hoist ropes for wear, lubrication, and tension. Replace, lubricate and adjust as required to meet code requirements.
7. Check hoistway tape hitches and broken tape switch.
8. Check car stile channels for bends or cracks; also car frame, cams, supports and car steadying plates.
9. Clean all parts of safeties and lubricate moving parts to assure their proper operation. Check and adjust clearance between safety jaws and guide rails. Visually inspect all safety parts.
10. Inspect machine, machine brake pads and disc, and drive sheave. Check for bearing wear. Inspect brake surface of emergency brake and clean deposits of brake pad powder. Ensure that faces of brake pads are parallel to hoist ropes.

F. Annually
1. Perform Semi-annual checks.

2. Thoroughly clean car and counterweight guide rails using a nonflammable or high flash point solvent to remove lint and dust. Vacuum down elevator hoistway.
3. Remove, clean and lubricate brake cores on machine brakes, clean brake pads. if necessary and inspect for wear. Adjust brake for proper operation.
4. Four car group supervisory control system operations shall be checked. The systems, dispatching scheduling and emergency servicing shall be tested and adjusted in accordance with manufacturer's literature. The CONTRACTOR shall prove to the satisfaction of the OWNER that the system functions properly. Checking out of the group supervisory system shall be performed during other than normal working hours with no inconvenience to the using public.
5. Additionally, car speeds shall be checked, and adjusted, to maintain contract speed. A report covering time intervals, dispatch times on various programs, door standing time and door opening and closing speeds, and car speeds shall be furnished to the OWNER. CONTRACTOR shall be responsible to correct any and all deviations from specified operations.
6. Follow machine manufacturer's recommendation regarding type of grease to be used for the machine bearings. (If applicable).

PART 3 - EXHIBITS

3.01 GENERAL

A. The exhibits below shall be considered part of this elevator maintenance agreement.
   1. EXHIBIT A - EQUIPMENT TO BE MAINTAINED.
   2. EXHIBIT B - CHARGEABLE BILLING PER CONTRACT TERMS.
   3. EXHIBIT C – SPARE PARTS LIST

EXHIBIT A
EQUIPMENT TO BE MAINTAINED

Building	Elevator(s)	Description	Elevator Type	Capacity	Speed	No. of Floors	Controller
Dulles State Office Building	#1-3	Passenger	Gearless Traction	2500	500	10	Microprocessor Controls (Existing) Microprocessor Controls (New)
Dulles State Office Building	#4	Service	Gearless Traction	3500	500	12	Microprocessor Controls (Existing) Microprocessor Controls (New)
Dulles State Office Building	#5	Service	Geared Traction	4000	75	3/1	Microprocessor Controls (Existing) Microprocessor Controls (New)

EXHIBIT B
CHARGEABLE BILLING PER CONTRACT TERMS

Contractor:_____ Building: _____

Contract No.:_____ Elevator No:_____

Proposal No.:_____ Date of Service:_____

Invoice No.:_____ Day of Service:_____

Description of Work: _____

_____

_____

_____

Explanation why work is not covered under contract: _____

_____

_____

_____

LABOR COST

Worker Description	Time Arrived	Time Job Completed	Hours	Cost
Mechanic				
Helper				
OT Mechanic				
OT Helper				
			Total:	

MATERIALS COST

Item	Quantity	Cost Per Unit	% Mark-Up	Total Cost
			Total:	

EXHIBIT C
SPARE PARTS LIST

A. The CONTRACTOR shall maintain on-site, as a minimum, the following replacement parts:
   1. Five (5) fuses of each size, type, and current rating
   2. Adequate supply of replacement LED lamps
   3. Four (4) each type car and hoistway door hanger rollers
   4. One (1) each type hoistway door interlock assembly, complete
   5. One (1) infrared door detector, receiver, and transmitter along with associated cables
   6. One (1) set of rollers for car and counterweight roller guide assemblies
   7. One (1) plug-in relay for each type used
   8. Two (2) replacement LED lamps for cab lights

B. The CONTRACTOR shall warehouse at its local office or have available within 24 hours of need, the following replacements parts:
   1. Door operator motor
   2. Door clutch
   3. Printed circuit boards each type used, including power supplies
   4. Printed circuit boards for signal fixtures
   5. Transformers for each type and size used
   6. VVVF Drive

END OF FULL MAINTENANCE ELEVATOR SPECIFICATION

APPENDIX

COMMISSIONING PROCESS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Document describes the overall commissioning process and is provided for information only. Commissioning requires the participation of all members of a Commissioning Team as described in this Document. The goal of Commissioning is to ensure that all systems are operating in a manner consistent with the Contract Documents. Each contractor designated as responsible for a commissioned system shall be familiar with all parts of this Document and the responsibilities that are required of each contractor as relates to all other Commissioning Team members. Each contractor shall be responsible for following a Commissioning Plan to be issued by the Commissioning Agent and shall execute all Commissioning responsibilities assigned to them in this and all other related Contract Documents.

1.02 COMMISSION TEAM AND COMMISSIONING TERM DESCRIPTIONS

A. Architect / Engineer (A/E): The prime consultant (architect) and sub-consultants who comprise the design team, generally the HVAC mechanical designer/engineer and the electrical designer/engineer.

B. Commissioning authority (CA): An independent agent. The CA directs and coordinates the commissioning activities. The CA does not take an oversight role. The CA is part of the Director's team.

C. Commissioning Plan (Cx Plan): An overall plan that provides the structure, schedule and coordination planning for the commissioning process.

D. Commissioning Team (Cx Team): The members of the commissioning team consist of the Commissioning Authority, the Director's Representative, the Commissioning Team Contractors, Subcontractor's, equipment Vendors and the Architect and design Engineers. The owner and the building or plant operator/engineer also may be members of the commissioning team.

E. Commissioning Team Contractor: (Cx Team Contractor) Contractors responsible for providing the systems specified for Commissioning in Section 019113 – General Commissioning Requirements, of their respective contracts. The Cx Team Contractors are totally responsible for their various Subcontractors and Vendors. Note that each system may have multiple Cx Team Contractors; i.e. - HVAC contractor installs a variable speed drive, and Electrical contractor provides power wiring to the drive.

F. Director's Representative (DR): The OGS Project Manager or Engineer in Charge of the Construction project, hired and acting on behalf of the Owner.

G. HVAC Contractor (HC): Cx Contractor responsible for all Commissioning activities associated with the HVAC contract, and all those of HVAC subcontractors and HVAC equipment vendors for Commissioned equipment supplied under the HVAC contract.
   1. Typical HVAC Subcontractors.
      a. Testing and Air Balancing Contractor (TAB).
      b. Controls Contractor (CC).

H. Electrical Contractor (EC): Cx Contractor responsible for all Commissioning activities associated with the Electrical contract, and all those of Electrical subcontractors and Electrical equipment vendors for Commissioned equipment supplied under the Electrical contract.

I. Owner: Client or facility representatives.

J. Subcontractors (Subs): The subcontractors to the Cx Contractors who provide and install building components and systems.

K. Vendor: Supplier of equipment.

L. Functional Performance Test (FT): Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The CA develops the functional test procedures in sequential written form. The CA coordinates, oversees and documents the actual testing. The Contractor performs the functional tests. FTs are performed after prefunctional checklists and startup are complete.

M. Prefunctional Checklist (PC): A list of items to inspect and component tests to conduct to verify proper installation of equipment.

N. Deferred Testing: Functional test procedures approved by the CA and DR to be performed after Functional Completion and post Substantial Completion of the project. Deferred testing may be required due to occupancy requirements, seasonal requirements for testing or deficiencies approved for correction at a later date by the DR.

O. Functional Completion: Final written approval by the DR that all Commissioning work is complete.

1.03 SUMMARY

A Commissioning: Commissioning is a systematic process of ensuring that (selected) building systems perform interactively according to the design intent and the Owner's operational needs. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:
   1. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors.
   2. Verify and document proper performance of (selected) equipment and systems.
   3. Verify that O&M documentation left on site is complete.

4. Verify that the Owner's operating personnel are adequately trained.

B. The commissioning process does not take away from or reduce the responsibility of the installing contractors to provide a finished and fully functioning product.

1.04 COMMISSIONING PROCESS

A. Management:
1. The CA is hired by, and works for, the Director's Representative and/or Owner. The CA directs and coordinates the commissioning activities. All Commissioning Team members work together to fulfill their contracted responsibilities and to meet the objectives of the Contract Documents.
2. It is noted that the services for the A/E and Commissioning Authority are not provided for in this contract. That is, the Cx Team contractors are not responsible for providing the CA's or A/E's services. Their responsibilities and tasks are listed in this Document to clarify the commissioning process.

B. Commissioning Process: The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur.
1. Commissioning begins prior to construction with a scoping meeting planned, scheduled and conducted by the CA where the commissioning process is reviewed with the commissioning team members. The CA will provide the initial schedule of primary commissioning events at the commissioning scoping meeting. Meeting minutes will be distributed to all parties by the CA.
2. The CA will develop a commissioning plan to provide guidance in the execution of the commissioning process. A draft copy of the plan will be presented at the scoping meeting for discussion.
3. The CA will work with the Cx Team contractors according to established protocols to list and schedule the commissioning activities, using his initial listing of events from the draft Cx Plan as a basis. The HC will integrate all commissioning activities into the Construction Progress or Master Schedule.
4. Additional meetings will be required throughout construction, scheduled by the CA with necessary Commissioning Team members attending, to plan, scope, coordinate, schedule future activities and resolve deficiencies. These meetings will be held monthly or bi-weekly during initial construction and can increase in frequency to as often as one per week in the final months or critical periods of each phase of construction.
5. After the initial commissioning scoping meeting the CA will update the plan which is then considered the "final" plan, though it may be revised as the project progresses. The Contract Specifications will take precedence over the Commissioning Plan.
6. Equipment documentation, including O&M manuals are submitted to the CA during the submittal process, including detailed start-up procedures. The CA reviews the O&M documentation for completeness.
7. The CA works with the Cx Team contractors and their subcontractors to develop startup plans and startup documentation formats for commissioned equipment and systems. This includes providing prefunctional checklists to be completed, during the startup process.
8. The CA develops specific equipment and system functional performance test procedures. The Cx Team contractors and Subs review the procedures and submit suggestions or comments. Procedures are finalized by the CA.

9. The Cx Team contractors and their subcontractors, under their own direction, execute and document the prefunctional checklists and perform startup and initial checkout for all commissioned systems. The CA documents that the checklists and startup were completed according to the approved plans and will spot check selected equipment prior to performing functional testing.
10. The procedures for Functional Testing are executed by the Cx Team contractors and subcontractors, under the direction of, and documented by the CA.
11. In general, the checkout and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with prefunctional checklists being completed before functional testing.
12. Items of non-compliance in material, installation or setup are corrected at the Cx Team contractors' expense and the system is retested.
13. Commissioning (Functional Completion) is completed before Project Substantial Completion.
14. The CA reviews, pre-approves and coordinates the training provided by the Cx Team contractors and their subcontractors and verifies that it is completed.
15. Deferred testing is conducted, as specified or required.

1.05 COMMISSIONING RESPONSIBILITIES

A. All Commissioning Team Members:
   1. Follow the Commissioning Plan.
   2. Attend commissioning scoping meeting and additional meetings, as necessary.

B. Architect/Engineer (A/E):
   1. Pre-Construction and Construction Phase:
      a. Attend the commissioning scoping meeting and selected commissioning team meetings as needed.
      b. Provide Design Intent and Basis of Design documents.
      c. Provide any design narrative documentation requested by the CA.
      d. Perform normal submittal review, construction observation as contracted.
      e. Any on-site observations required by contract should be completed just prior to system startup.
      f. Coordinate resolution of system deficiencies identified during commissioning, according to the contract documents.
      g. Prepare and submit final as-built design intent documentation for inclusion in the O&M manuals.

C. Commissioning Authority (CA):
   1. The CA is not responsible for design concept, design criteria, compliance with codes, design or construction scheduling, cost estimating, or construction management. The CA may assist with problem-solving, non-conformance or deficiencies, but ultimately that responsibility resides with the Director's Representative, the Cx Team contractors and the A/E. The primary role of the CA is to develop and coordinate the execution of a testing plan and to observe and document that systems are functioning in accordance with the documented design intent, in accordance with the Contract Documents. The Contractors will provide all tools or the use of tools to start, check-out and functionally test equipment and systems, except for specified testing with portable data-loggers, which shall be supplied and installed by the CA.

2. Pre-Construction and Construction Phase
   a. Coordinates and directs the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines, schedules and technical expertise.
   b. Coordinate the commissioning work and, with the DR and Cx Team contractors, ensure that all commissioning activities are scheduled into the Construction Progress Schedule.
   c. Plan and conduct a commissioning scoping meeting and other commissioning meetings.
   d. Revise, as necessary, the Commissioning Plan.
   e. Request and review information (including O&M materials) required to perform commissioning tasks and develop system start-up and checkout procedures.
   f. Review and approve normal Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the A/E reviews.
   g. Develop an enhanced start-up and initial systems checkout plan with Cx Team contractors.
   h. Write and distribute prefunctional tests and checklists.
   i. With necessary assistance and review from installing contractors, write the functional performance test procedures for equipment and systems. This may include energy management control system trending, stand-alone data logger monitoring or manual functional testing. Submit to Cx Team contractors for review.
   j. Perform site visits, as necessary, to observe component and system installations. Attend selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.
   k. Witness all or part of any test, flushing or start-up procedures, sufficient to be confident that proper procedures were followed. Document this testing and include the documentation in O&M manuals. Notify Director's Representative of any deficiencies in results or procedures.
   l. Approve prefunctional tests and checklist completion by reviewing prefunctional checklist reports and by selected site observation and spot checking.
   m. Approve system startup by reviewing start-up reports and by selected site observations.
   n. Review TAB execution plan.
   o. Oversee and approve functional testing of Commissioned systems.
   p. Coordinate, witness, and approve manual functional performance tests performed by installing contractors. Coordinate retesting as necessary until satisfactory performance is achieved.
   q. Analyze any functional performance trend logs and monitoring data to verify system performance.
   r. Approve air and water systems balancing by spot testing, by reviewing completed reports or by selected site observation.

s. Maintain a master deficiency and resolution log and a separate testing record. Provide the Director's Representative with written progress reports and test results with recommended actions.
t. Review and approve the preparation of the O&M manuals.
u. Review equipment warranties to ensure that the Director's responsibilities are clearly defined.
v. Oversee and approve the training of the Owners operating personnel.
w. Compile and maintain a commissioning record and building systems book(s).
x. Provide a final commissioning report (as described in this Document).

3. Warranty Period:
   a. Coordinate and supervise required seasonal or deferred testing.
   b. Return to the site at 10 months into the 12 month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.

D. Director's Representative:
1. Pre-Construction and Construction Phase:
   a. Manage the contract of the A/E and of the Cx Team contractors.
   b. Attend a commissioning scoping meeting and other commissioning team meetings.
   c. Arrange for facility operating and maintenance personnel to attend various field commissioning activities and field training sessions according to the Commissioning Plan.
   d. Facilitate the coordination of the commissioning work by the CA and Cx Team contractors; ensure that commissioning activities are being scheduled into the Construction Progress schedule.
   e. Review and approve the final Commissioning Plan.
   f. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CA.
   g. Observe and witness prefunctional checklists, startup and functional testing of selected equipment.
   h. Review commissioning progress and deficiency reports.
   i. Coordinate the resolution of non-compliance and design deficiencies identified in all phases of commissioning.
   j. Assist in coordinating the training of Owner's personnel.
   k. Provide final approval for the completion of the commissioning work.
2. Warranty Period:
   a. Assist the CA as necessary in the seasonal or deferred testing.

E. Commissioning Team Contractors (Includes Subcontractors and Vendors):

1. Pre-Construction and Construction Phase

a. Designate in writing a company representative to act as "coordinator" for all commissioning activities. (Coordinator can be project supervisor or manager).

b. Facilitate the coordination of the commissioning work by the CA, and with the CA ensure that commissioning activities are being scheduled into the Construction Progress Schedule.

c. Include the cost of commissioning responsibilities in the total contract price. Provide requested documentation, prior to or during the submittal period (prior to normal O&M manual submittals), to the CA for development of start-up and functional testing procedures.

1) Typically this will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, installation, start-up and checkout materials that are shipped inside the equipment and field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Agent.

2) The Commissioning Agent may request further documentation necessary for the commissioning process.

d. In each purchase order or subcontract written, include appropriate requirements for submittal data, O&M data, commissioning tasks and training.

e. Ensure that all subcontractors execute their commissioning responsibilities according to the Contract Documents and schedule.

f. Provide a copy of the O&M manuals and submittals of commissioned equipment, through the DR, to the CA for review and approval.

g. Provide assistance to the CA in preparing the specific functional performance test procedures. The Cx Team contractors shall review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests. Assist in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.

h. Develop a full start-up and testing plan using manufacturer's start-up procedures and the prefunctional checklists from the CA for all commissioned equipment. Submit to CA for review and approval prior to startup.

i. During the startup and initial checkout process, execute all portions of the prefunctional checklists for all commissioned equipment.

j. Perform and clearly document all completed startup and system operational checkout procedures, providing a copy to the CA.

k. Address current punch list items before functional testing. Air and water TAB shall be completed with deficiencies and problems remedied before functional testing of the respective air- or water-related systems.

l. Provide skilled technicians to execute starting of equipment and to execute the functional performance tests under the direction of the CA. Ensure that they are available and present during the agreed upon

schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving. Assist the CA in interpreting the monitoring data, as necessary.

m. Correct deficiencies (differences between specified and observed performance) as interpreted by the CA, Director's Representative and A/E and retest the equipment.

n. Prepare O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.

o. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of all warranties.

p. During construction, maintain as-built red-line drawings for all drawings and provide final CAD as-builts for contractor-generated coordination drawings. Update after completion of commissioning (excluding deferred testing).

q. Provide training of the Owners operating staff using expert qualified personnel, as specified.

2. Warranty Period

a. Execute seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.

b. Ensure that Cx Team contractors correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

F. Vendors:

1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities for the Owner to keep warranties in force.
2. Provide information requested by CA regarding equipment sequence of operation and testing procedures.
3. Through the contractors they supply products to, analyze specified products and verify that the designer has specified the newest most updated equipment reasonable for this project's scope and budget.
4. Review test procedures for equipment installed by factory representatives.
5. Assist in equipment testing per agreements with the Cx Team contractors and subcontractors.
6. Include all special tools and instruments (only available from vendor and specific to a piece of equipment) required for testing equipment according to these Contract Documents, except for stand-alone data logging equipment that may be used by the CA.

1.06 PREREQUISITES TO FUNCTIONAL COMPLETION

A. All Commissioning must be complete prior to Functional Completion, unless approved in writing by the Director's Representative. Exceptions to this are planned system training performed after occupancy and any required seasonal or approved deferred testing. This includes for all systems, but is not limited to:

1. Completed and signed start-up and prefunctional checklist documentation.
2. Requested trend log data
3. Submission of final approved TAB report.
4. Completion of all required controls work.
5. Completion of all functional testing.

6. Required training of O&M personnel completed and approved.
7. Submission of the approved O&M manuals.
8. All identified deficiencies have been corrected or are approved as exceptions to this milestone by the Director's Representative.

B. The Director's Representative will determine the date of Functional Completion after reviewing the Commissioning Agent's recommendation for Functional Completion.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 REPORTING

A. The CA will provide regular reports to the DR with increasing frequency as construction and commissioning progresses. Standard forms will be provided and/or referenced in the Commissioning Plan.

B. The CA will regularly communicate with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling changes through memos, progress reports, etc.

C. Testing or review approvals and non-conformance and deficiency reports are made regularly.

D. A final summary report by the CA will be provided to the DR, focusing on evaluating commissioning process issues and identifying areas where the process could be improved. All acquired documentation, logs, minutes, reports, deficiency lists, communications, findings, unresolved issues, etc., will be compiled in appendices and provided with the summary report. Prefunctional checklists, functional tests and monitoring reports will not be part of the final report, but will be stored in the Commissioning Record in the O&M manuals.

3.02 SUBMITTALS

A. The CA will provide appropriate contractors with a specific request for the type of submittal documentation the CA requires to facilitate the commissioning work. These requests will be integrated into the normal submittal process and protocol of the construction team. At minimum, the request will include the manufacturer and model number, the manufacturer's printed installation and detailed start-up procedures, full sequences of operation, O&M data, performance data, any performance test procedures, control drawings, wiring diagrams and details of factory tests. In addition, the installation and checkout materials that are shipped inside the equipment and the field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning authority. All documentation requested by the CA will be included by the Cx Team contractors in their O&M manual contributions.

B. The CA may request additional design narrative from the A/E and the Cx Team Contractors, depending on the completeness of the design intent documentation and sequences provided with the Specifications.

C. The Commissioning authority will review and approve submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The Commissioning authority will notify the DR of items missing or areas that are not in conformance with Contract Documents which may affect the commissioning and which require resubmission.

D. Submittals to the CA do not constitute compliance for O&M manual documentation. The compilation and submission of O&M manuals is the responsibility of the Contractor. The CA will review and approve individual O&M documents.

3.03 START-UP, PREFUNCTIONAL CHECKLISTS AND INITIAL CHECKOUT

A. The following procedures apply to all equipment to be commissioned.

B. The project will require startup and initial checkout to be executed in phases. This phasing will be planned and scheduled in a coordination meeting of the CA, DR and the Cx Team contractors. Results will be added to the Construction Progress Schedule and Commissioning Plan.

C. General. Prefunctional checklists are important to ensure that the equipment and systems are installed and operational. It ensures that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. The prefunctional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.

D. Start-up and Initial Checkout Plan. The CA shall assist the Commissioning Team contractors responsible for startup of any equipment in developing detailed start-up plans. The primary role of the CA in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures have been completed.

1. The prefunctional checklists and procedures indicate required procedures to be executed as part of startup and initial checkout of the systems and the party responsible for their execution.
2. The prefunctional checklists and tests are provided by the CA to the Contractor. The Contractor determines which trade is responsible for executing and documenting each of the line item tasks and notes that trade on the form. Each form will have more than one trade responsible for its execution.
3. Any Cx Team contractor responsible for providing equipment and systems designated for Commissioning, develops the full start-up plan by combining (or adding to) the CA's prefunctional checklists with the manufacturer's detailed start-up and checkout procedures. The Cx Team contractor shall make use of the manufacturers O&M manual and the normally used field checkout sheets in developing the complete start-up plan. The plan will include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the end of the plan. The full start-up plan could consist of something as simple as:

a. The CA's prefunctional checklists.
b. The manufacturer's standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
c. The manufacturer's normally used field checkout sheets.

4. The contractor submits the full startup plan to the CA for review and approval.
5. The CA reviews and approves the procedures and the format for documenting them, noting any procedures that need to be added.
6. The full start-up procedures and the approval form may be provided to the DR for review and approval, depending on management protocol.

E. Execution of Prefunctional Checklists and Startup.

1. Prior to startup, the Cx Team contractors, subcontractors and vendors schedule startup and checkout with the DR and CA. The performance of the prefunctional checklists, startup and checkout are directed and executed by the Cx Team Contractor, subcontractor or Vendor responsible for the equipment.
2. The CA shall observe, at minimum, the procedures for each piece of primary equipment, unless there are multiple units, (in which case a sampling strategy may be used as approved by the DR). In no case will the number of units witnessed be less than four nor less than 20% of the total number of identical or very similar units.
3. For lower-level components of equipment, (e.g., VAV boxes, sensors, controllers), the CA shall observe a sampling of the prefunctional and start-up procedures. The sampling procedures are identified in the commissioning plan.
4. The Cx Team contractors, subcontractors and vendors shall execute startup and provide the CA with a signed and dated copy of the completed start-up and prefunctional tests and checklists.
5. Only individuals that have direct knowledge and witnessed that a line item task on the prefunctional checklist was performed shall initial or check that item off.

F. Deficiencies, Non-Conformance and Approval in Checklists and Startup.

1. The contractors shall clearly list any outstanding items of the initial start-up and prefunctional procedures that were not completed successfully, at the bottom of the procedures form or on an attached sheet. The procedures form and any outstanding deficiencies are provided to the CA within two days of test completion.
2. The CA reviews the report and submits either a non-compliance report or an approval form to the DR. The installing Cx Team contractors, subcontractors or vendors shall correct all areas that are deficient or incomplete in the checklists and tests in a timely manner, and shall notify the CA as soon as outstanding items have been corrected and resubmit an updated start-up report and a Statement of Correction on the original non-compliance report. When satisfactorily completed, the CA recommends approval of the execution of the checklists and startup of each system to the DR using a standard form.
3. Items left incomplete, which later cause deficiencies or delays during functional testing may result in back-charges to the responsible party.

G. Functional testing is intended to begin upon completion of a system. Functional testing may proceed prior to the completion of systems or sub-systems at the discretion of the CA and DR. Beginning system testing before full completion does not relieve the Contractor from fully completing the system, including all prefunctional checklists as soon as possible.

H. The Cx Team contractors have start-up, prefunctional and functional testing responsibility and are required to complete systems and sub-systems so they are fully functional, meeting the design objectives of the Contract Documents. The commissioning procedures and functional testing do not relieve or lessen this responsibility or shift that responsibility partially to the Commissioning Agent or Director's Representative.

3.04 FUNCTIONAL PERFORMANCE TESTING

A. This article applies to all commissioning functional testing for all divisions.

B. Objectives and Scope.

1. The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems from a state of physical completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems. In general, each system should be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load) where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested.

C. Test Methods.

1. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance). When a control system is part of the project, functional performance testing may use the controls to monitor the performance and analyze the results using the control system's trend log capabilities or by stand-alone data loggers. The CA may substitute specified methods or require an additional method to be executed, other than what was specified, with the approval of the DR. The CA will determine which method is most appropriate for tests that do not have a method specified.
2. Setup. Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The Contractor executing the test shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the Contractor shall return all affected building equipment and systems, due to these temporary modifications, to their pre-test condition.
3. Simulated Conditions. Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.
4. Overwritten Values. Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible. Such testing methods often can only test a part of a system, as the interactions and responses of other systems will be erroneous or not applicable. Simulating a condition is preferable (i.e., for the above case, the outside air sensor could be heated with a hair blower rather than overwriting the

value, or by altering the appropriate setpoint to see the desired response). Before simulating conditions or overwriting values, sensors, transducers and devices shall have been calibrated.

5. Simulated Signals. Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.
6. Altering Setpoints. Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable. For example, to see the AC compressor lockout work at an outside air temperature below 55F, when the outside air temperature is above 55F, temporarily change the lockout setpoint to be 2F above the current outside air temperature.
7. Indirect Indicators. Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification is completed during prefunctional testing.

D. Problem Solving. The CA will recommend solutions to testing problems; however the burden of responsibility to solve, correct and retest problems is with the Cx Team contractors, subcontractors and A/E.

3.05 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

A. Documentation.
1. The CA shall witness and document the results of all functional performance tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the DR for review and approval and to the Cx Team contractors for review. The CA will include the filled out forms in the Final Commissioning Report.

B. Non-Conformance.
1. The CA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported to the DR.
2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CA. In such cases the deficiency and resolution will be documented on the procedure form.
3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
4. As tests progress and a deficiency is identified, the CA discusses the issue with the executing contractor.
   a. When there is no dispute on the deficiency and the Contractor accepts responsibility to correct it:
      1) The CA documents the deficiency and the Contractor's response and intentions and they go on to another test or sequence. The CA submits the non-compliance reports to the DR for signature, if required. A copy is provided to the Cx Team contractors and CA. The Cx Team contractors correct the deficiency, sign the statement of correction at the bottom of the non-compliance form certifying that the equipment is ready to be retested and send it back to the CA.

2) The CA reschedules the test and the test is repeated.

b. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:

1) The deficiency shall be documented on the non-compliance form with the Cx Team contractor's response and a copy given to the DR and to the Cx Team contractor.

2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the DR. Final acceptance authority is with the DR.

3) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, signs the statement of correction on the non-compliance form and provides it to the CA. The Contractor reschedules the test and the test is repeated until satisfactory performance is achieved.

5. Cost of Retesting.

a. The cost for the Cx Team contractor to retest a prefunctional or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the DR.

b. For a deficiency identified, not related to any prefunctional checklist or start-up fault, the following shall apply: The CA will direct the retesting of the equipment once at no "charge" to the project for their time. However, the CA's time for a second retest will be charged to the Cx Team contractors.

c. The time for the CA to direct, attend or witness any retesting required because a specific prefunctional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back-charged to the Cx Team contractors.

6. The Contractor shall respond in writing to the CA and DR concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.

7. The CA retains the original non-conformance forms until the end of the project.

8. Any required retesting by any contractor shall not be considered a justified reason for a claim of delay or for a time extension by the prime contractor.

C. Failure Due to Manufacturer Defect:

1. If 10 percent, or three units, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance specification, all identical units may be considered unacceptable by the DR. In such case, the Contractor shall provide the Director's Representative with the following:

a. Within one week of notification from the DR, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. Within two weeks of the original notice, a signed and dated, written explanation of the findings, problems, cause of failures, etc. and all proposed solutions shall be provided to the DR. The proposed solutions shall not significantly exceed the specification requirements of the original installation.

b. The DR will determine whether a replacement of all identical units or a repair is acceptable.
c. Two examples of the proposed solution will be installed by the Contractor and the installations will be tested for up to one week, upon which the DR and CA will decide whether to accept the solution.
d. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

D. Approval:
1. The CA notes each satisfactorily demonstrated function on the test form. Formal approval of the functional test is made later after review by the CA and by the DR, if necessary. The CA recommends acceptance of each test to the DR using a standard form. The DR gives final approval on each test using the same form, providing a signed copy to the CA and the Contractor.

3.06 OPERATION AND MAINTENANCE MANUALS

A. Standard O&M Manuals.
1. Additional content and format requirements for the standard O&M manuals are detailed in Section 017716 and individual equipment sections.
2. The following O&M manual requirements do not replace O&M manual documentation requirements elsewhere in these specifications.

B. Review and Approvals.
1. CA Review and Approval. Prior to substantial completion, the CA shall review the O&M manuals, documentation and redline as-builts for systems that were commissioned, concurrently with the A/E. The CA will communicate concerns about the manuals to the DR. Upon a successful review of the corrections, the CA recommends approval and acceptance of these Sections, with respect to the commissioning, to the DR. The CA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated. This work does not supersede the A/E's review of the O&M manuals according to the A/E's contract.

3.07 TRAINING OF OWNERS OPERATING AND MAINTENANCE PERSONNEL

A. The Cx Team contractors and CA shall be responsible for training coordination, scheduling and ultimately for ensuring that training is completed.

B. The CA shall be responsible for reviewing and approving the content and adequacy of the training of Owners personnel for commissioned equipment.
1. Hands-on training shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and preventative maintenance for all pieces of equipment.
2. Training shall occur after functional testing is complete, unless approved otherwise by the DR.

3. Duration of Training: The Cx Team contractor shall provide training on each piece of equipment according to the durations in individual equipment specifications.

3.08 DEFERRED TESTING

A. Unforeseen Deferred Tests:
   1. If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the DR. These tests will be conducted in the same manner as the seasonal tests as soon as possible. Services of necessary contractors, vendors etc., will be negotiated.

B. Seasonal Testing:
   1. During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) specified in Section 019113 shall be completed as part of this contract. The CA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the appropriate contractors, with facilities staff and the CA witnessing. Any final adjustments to the O&M manuals and as-builds due to testing will be made.

3.09 WRITTEN WORK PRODUCTS

A. The commissioning process generates a number of written work products described in various Sections of the Specifications. The Commissioning Plan lists all the formal written work products, describes briefly their contents, who is responsible to create them, their due dates, who receives and approves them and the location of the specification to create them. In summary, the written products are:
   1. Product Developed By:
      a. Final Commissioning Plan: CA.
      b. Commissioning Meeting Minutes: CA.
      c. Commissioning Schedules: CA with Cx Team contractors and DR.
      d. Equipment Documentation Submittals: Cx Team contractors.
      e. Sequence Clarifications: Cx Team contractors, and A/E as needed.
      f. Prefunctional Checklists: CA.
      g. Startup and Initial Checkout Plan: Cx Team contractors and CA (compilation of documents).
      h. Startup and Initial Checkout Forms Filled Out: Cx Team contractors.
      i. Final TAB Report: TAB.
      j. Issues Log (deficiencies): CA.
      k. Commissioning Progress Record: CA.
      l. Deficiency Reports: CA.
      m. Functional Test Forms: CA.
      n. Filled Out Functional Tests: CA.
      o. O&M Manuals: Cx Team contractors.
      p. Commissioning Record Book: CA.
      q. Overall Training Plan: CA and Cx Team contractors.
      r. Specific Training Agendas: Cx Team contractors.
      s. Final Commissioning Report: CA.
      t. Miscellaneous Approvals: CA.

END OF SECTION